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RUMEX PERSICARIOIDES AND ITS ALLIES IN NORTH AMERICA.

HAROLD ST. JOHN.

(Plate 113.)

SEVERAL collections of the annual *Rumex persicarioides* and a nearly related species from about the Gulf of St. Lawrence have led to a study of these species and their allies. Through the courtesy of the curators I have been able to study the collections of this group in the herbaria of the Academy of Natural Sciences of Philadelphia, Yale University, and the Missouri Botanical Garden. I wish here to express my gratitude to these gentlemen, Mr. Stewardson Brown, Mr. A. F. Hill, and Dr. J. M. Greenman.

Along the borders of salt marshes and brackish ponds on Prince Edward Island grows a fleshy annual *Rumex* remarkable for the large straw-colored tubercles borne on the valves and for the plane, linear, cordate-based leaves. This plant tallies perfectly with Linnaeus's description in the *Species Plantarum* of *Rumex persicarioides*.¹ It is characterized, in contrast with *R. maritimus* which follows it directly in this work, by having large, pale tubercles borne on each valve, "*valvulae . . . , omnes tectae gravis pallidis magnis.*" "*Habitat in Virginia.*" These large pale tubercles are the most conspicuous character of this plant of Prince Edward Island, other parts of the lower St. Lawrence system, and Cape Ann, Massachusetts.

In order to make this identification doubly sure, Mr. Sidney F. Blake has been kind enough to examine the type for me, and to send

¹ L. Sp. Pl. i. 335 (1753).

me sketches and a description of it, saying: "*R. persicarioides* is represented in the Linnaean Herbarium by two sheets. The specimen collected by Kalm, which bears no indication of locality, is a tiny procumbent plant about a dm. high with narrowly lance-oblong leaves, not noticeably cordate at the base (but badly crumpled), and small fruiting calyx bearing three large, almost reticulate grains (now brownish, but apparently pale when fresh) which almost entirely conceal the tiny valves, which bear two or three curved teeth. For the most part the teeth are very inconspicuous and I had something of a search to find one fit to sketch."

In the Gray Herbarium is a fragment, marked in Gray's handwriting "*Rumex persicarioides* (K) Hb. Linn." It is a mere scrap from a lateral branch of the inflorescence, giving no hint of the leaf characters, but it does show the swollen, elliptic-ovate tubercles so characteristic of the plant of Prince Edward Island. As to the locality where Kalm found this plant, there is no indication on the label. We know, however, that Kalm on July 23, 1749, started from Lake Champlain for Montreal following for some distance the Richelieu River and that during August and September of the same year he journeyed down the St. Lawrence River to Bay St. Paul, far below the limit of tide-water.¹ Diagonally across the river from here, at Caccouna, *Rumex persicarioides* is definitely known; and quite recently Bro. Marie-Victorin has collected it in Chambly, P. Q. He writes that a colony of the plants were growing on one of the small islands in Chambly Basin of the Richelieu River, midway between Lake Champlain and the St. Lawrence. It seems quite probable, then, in spite of Linnaeus's cited locality "Virginia," that Kalm found his specimens at some such place on the Richelieu River or the lower St. Lawrence, the region where we now know the species in its greatest abundance. In view of their perfect agreement there seems little doubt of the identity of the fragment in the Gray Herbarium with Linnaeus's type.

Quoting Mr. Blake again, "The second specimen was raised at the Upsala Garden from seed collected by Kalm, and, while a much taller plant (about 2.5 dm.) with more elongate internodes, it is in all its characters identical with the specimen of Kalm. The interesting fact concerning this H[ortus] U[psalensis] plant is that the label is

¹ Kalm, *Reise nach nordlichen Amerika*, iii. 517-525 (1754).

marked 'canade' (nsis)." Mr. Blake, then, confirms my surmise that Kalm's original collection was probably not made in "Virginia," but somewhere on the St. Lawrence system.

The earlier floras of our country, as that by Pursh,¹ credit *Rumex persicarioides* to "shady wet woods, on the banks of ditches; Virginia and Carolina": and these records have been continued by the more recent Manuals. I have seen no specimen from the Atlantic coast from further south than Cape Ann, Massachusetts, nor have I found any convincing records of it to the southward. The plant as I know it about the Gulf of St. Lawrence grows on the salt marshes and along the saline shores, not "in shady wet woods." The improbable habitat given by Pursh and the fact that no specimens are known from further south than Massachusetts makes the records from "Virginia and Carolina" very questionable.

Now let us consider the identity of the other annual *Rumex* of the Gulf of St. Lawrence, a plant widely distributed in America and for many years passing as *R. maritimus* L., but generally treated in recent years (following Trelease) as *R. persicarioides*.

In the *Species Plantarum*, *Rumex maritimus* is defined in very few words:² valves toothed, bearing tubercles, leaves linear. Habitat on the saline shores of Europe. This description follows directly after that of *R. persicarioides*, yet there is no mention of the leaves having wavy margins or truncate bases. Mr. Blake has been kind enough to help in interpreting this plant also: "The type of *R. maritimus* is an erectish plant about 2.5 dm. high with narrowly lance-oblong leaves, cuneate at base, rhombic-lanceolate valves with about three conspicuous cusp-teeth on each side, longer than the breadth of the valves, and lance-oblong grains much narrower than the valves which bear a few strong reticulations. It is obviously the *R. persicarioides* of Gray's Manual ed. 7 p. 357." As shown by numerous plates and by authentic specimens this common plant of the saline shores and alkaline plains of Eurasia has the leaves plane, narrowly linear; and the sharp pointed tubercles lanceolate in outline.

The American plant, ranging from the Gulf of St. Lawrence southward along the Atlantic coast to southern New England, and from Wisconsin and Illinois westward to British Columbia and Lower

¹ Pursh, Fl. Am. Sept. i. 248 (1814).

² "RUMEX floribus hermaphroditis: valvulis dentatis graniferis, foliis linearibus. Habitat in Europae litoribus maritimis." L. Sp. Pl. i. 335 (1753).

California is very like the European *R. maritimus* and indistinguishable from it in fruit- and flower-characters, but with a very marked and almost constant tendency to have the leaves cordate or truncate at base and often wavy or undulate along the margins.

Occasional specimens of the American plant show the development of a third bristle on each side of the valve,¹ and this was taken by Trelease as one of the characters separating the American "*R. persicarioides*" from the Eurasian *R. maritimus*. This character, however, is not constant on any one plant or on the plants from any one region, or in conjunction with any other character. For this reason this tendency is not worthy of special recognition in the American plant, when as a matter of fact, the Linnaean type, as described by Mr. Blake, has the valves with "about three conspicuous cusp-teeth on each side."

Since the common North American plant, although indistinguishable in fruit from the European *R. maritimus*, differs from the old-world plant in the cordate- or truncate-based and usually undulate leaves, it seems worthy of varietal rank under *R. maritimus*.

Thinking that it would be very strange if this plant, so common over most of North America, did not have a valid name, I have searched the literature and find that in 1895 Philippi described a *Rumex fueginus*.² He characterized this plant from eastern Fuegia as having "leaves all linear, truncate at base," and in the other characters his description is quite applicable to our North American plant, except that only one valve bears a tubercle.

Five years later Dusén³ reduced Philippi's species to a variety of *R. maritimus* L., commenting that, "although my specimens differ from Philippi's description in so far that all the sepals bear callosities, I have no hesitation in putting *Rumex fueginus* here, as the agreement is otherwise complete."

In his revision of *Rumex* Trelease⁴ reduces to synonymy under "*R. persicarioides* L.," which, as I have shown, should now be treated

¹ Trelease, 3d Ann. Rep. Mo. Bot. Gard. 94 (1892).

² "foliis omnibus petiolatis, linearibus, basi truncatis, . . . valvulae . . . , unica callifera." Philippi, Anales Univ. Chile, xci. 493 (1895).

³ "*Rumex maritimus* L. var. *fuegina* [us] (Phil.) — Obschon mein Exemplar insofern von PHILIPPI'S Beschreibung des *Rumex fueginus* abweicht, dass sämtliche innere Perianthblätter Schwielen tragen, so hege ich kein Bedenken, da die Übereinstimmung sonst vollständig ist, dieselbe zu dem *Rumex fueginus* PHIL. zu ziehen." P. Dusén, Svenska Expd. till Magellansländerna, iii. No. 5, 194 (1900).

⁴ Trelease, l. c.

as *Rumex maritimus*, var. *fueginus*, a plant described from Kentucky by Michaux¹ as *R. crispatulus*. This is depicted as "with the lower leaves oval, the upper lanceolate, all crisped on the margin, undulate; the inflorescence leafless; the fruiting calyx with obtuse cordate valves, tufted on either side, tridentate, one valve naked, the other two unequally grain bearing." Trelease comments that this "is the form [of *R. persicarioides*] with broadest most wavy leaves, more naked inflorescence, and larger valves, only two of them bearing unequal callosities; but a study of the many forms growing intermingled about St. Louis, has not shown the wisdom of maintaining it even as a variety." Prof. Fernald has examined the type of *Rumex crispatulus* in the Michaux Herbarium and has noted that this specimen is *R. obtusifolius* L. The oval leaves, the leafless inflorescence, the unequal callosities, and the locality, Kentucky, far distant from the known range of *Rumex maritimus* var. *fueginus*, all make this disposition of Michaux's species quite satisfactory.

At first thought, the distribution of *Rumex maritimus*, var. *fueginus* seems to be very peculiar, growing as it does from the Gulf of St. Lawrence south to Rhode Island,² and from the southern end of Lake Michigan northwestward to British Columbia and southwestward to Lower California, and reappearing on the southern tip of South America,³ in eastern Patagonia and Tierra del Fuego. My search for specimens or trustworthy records of the plant from Mexico proper, Central America, and the northern part of South America has been in vain.

The great similarity between the floras of the southern tip of South America and parts of North America has been known for a long time. As early as 1881 Gray and Hooker⁴ pointed out the identity of the genera and in many cases the species growing in these widely separated areas.

The traditional explanation of this wide disruption of similar floras

¹ Michx. Flor. Bor. Am. i. 217 (1803).

² The records of this plant from the southern Atlantic coast, as well as of *R. persicarioides*, which has so often been confused with it, seem to be very doubtful. No specimens have been seen from further south than Block Island, off the entrance to Narragansett Bay. For comments see Stone, Plants of Southern New Jersey, 421 (1911). Specimens of the European *R. maritimus* are occasionally found on the ballast lands near the large ports of our southern Atlantic coast.

³ See W. J. Hooker, Flor. Bor. Am. ii. 130 (1838).

⁴ A. Gray & J. D. Hooker, Vegetation of the Rocky Mountain Region; Bull. U. S. Geog. Surv. vi. no. i (1881).

is the probable climatic changes induced by the advance of the Pleistocene glaciers from the Arctic until they covered the larger part of North America, with the inevitable driving south of the flora and fauna to points whence it was possible for the boreal types to cross along the Cordilleras to South America. Finally, in the period of ameliorating climate accompanying or following the withdrawal of the glaciers, these plants, in order to maintain themselves in a suitable climatic zone, migrated towards either pole. This explanation seems satisfactory enough for the boreal genera and species, because a mere land connection between Patagonia and temperate North America is not enough; the climatic conditions prevailing over it needing to be such as to allow the arctic plants to migrate across. In order fully to justify this theory we should expect to find isolated on some of the higher mountains of Central America species which occur in temperate North America and Patagonia, or some that are found in North America, but which did not succeed in making the journey to Patagonia. Such occurrences have been frequently demonstrated, as in the case of "the presence of *Cystopteris fragilis* and *Phleum alpinum* at an altitude of 12,000 feet on Mt. Orizaba in southern Mexico"¹ and other similar cases. Both of the species cited occur in the cooler parts of North America and at the southern tip of South America.

A more recent theory² is interesting in this connection: Scharff argues that this relationship between the two widely separated areas, North America and southern South America, is the result of a much more ancient dispersal including in the animal kingdom earthworms, slugs, salamanders, and mammals,³ and occurring "probably during the dawn of the Tertiary Era." Geological charts illustrating the supposed land-areas during the Cretaceous and early Tertiary show a now obliterated land connection⁴ between the western coast of North America at first with the southern tip of South America, and later with the northern part of the west coast of South America. Scharff's most convincing argument for such a migration in Cretaceous or early Tertiary times is a quotation from Prof. Berry⁵ "that in mid-Cretaceous times seventy-five percent of the known plants of Argentina were characteristic types of the Dakota-group flora of North America."

¹ Fernald, RHODORA iv. 150 (1902).

² Scharff, Distrib. and Orig. of Life in Am. 413-419 (1912).

³ Also "the genus *Carabus*, flightless beetles," Gadow, Wanderings of Animals, 90 (1913).

⁴ Scharff, l. c. 280, 294, and Gadow, l. c. maps 11 and 12.

⁵ Scharff, l. c. 414.

Regarded from this angle, it can be seen that all our known stations for *Rumex maritimus* var. *fueginus* lie near the line of the Cretaceous or early Tertiary sea coasts, and it is significant that a few other plants have a somewhat similar, but not identical distribution. *Distichlis spicata*, credited to Patagonia by Macloskie¹ on the basis of a report by John Ball, but not seen by me, is found otherwise only in North America; but it there extends down the Atlantic coast to Florida and appears on some of the Antilles and in Mexico. *Ranunculus Cymbalaria* has a range in North America somewhat similar, but in South America is found in the Andes as far north as Ecuador. This species, however, is somewhat circumpolar in distribution, occurring in widely separated sections of Asia.

However strong the evidence from the animal kingdom may be, we do not seem to find sufficient confirmation in the plant kingdom to demonstrate conclusively that the discontinuous distributions, such as that of *Rumex maritimus* var. *fueginus*, must have been brought about by a Cretaceous or early Tertiary land bridge outside the present limits of America, as is argued by Scharff. Until we know better the flora of western South America it seems safer to infer that the *Rumex* may sometime be found, like *Ranunculus Cymbalaria*, among the Andes of Central, or northern South America, and to think that, of the two interpretations above outlined, at least in the case of the higher plants, the one advocated by Hooker, Gray and many others, is the more probable explanation.

In arid parts of western America,—Utah, Lower California, and eastern Washington—a plant closely simulating *R. maritimus* var. *fueginus* has been found, which has the bristles of the valve nearly or entirely obsolete. Although but scantily represented in herbaria this seems worthy of recognition. It is possible that this is the plant described by Watson as *R. salicifolius* var. (?), Wats. Bot. King Exp. 314 (1871), as is implied by Trelease,² but Watson's material has not been seen by the writer.

RUMEX MARITIMUS L., var. *athrix*, n. var., *R. maritimum*, var. *fueginum* foliis lineari-lanceolatis cordatis vel basi truncatis simulans sed differt setis valvularum obsolescentibus vel absolute deficientibus. —TYPE, M. E. Jones, no. 5839, clay, altitude 5400 feet, Vermilion, UTAH.

¹ Macloskie, Princeton Exped. to Patagonia viii, pt. 5, sect. 1, 218 (1904).

² Trelease, l. c. 94.

Growing as a native in Europe and occasionally as an adventive in America is *Rumex limosus* Thuill., which is closely allied to *Rumex maritimus*. The former is variously interpreted as a hybrid or as a distinct species, depending solely on the point of view of the author, since no experimental verification of this point has been made. *Rumex limosus* seems to be recognizable by the separation of the inflorescence into distinct glomerules, the swollen, campanulate tip of the pedicel, and the greater proportional breadth of the valves.

KEY TO THE AMERICAN MEMBERS OF THIS GROUP.

- A. Tubercles turgid, elliptic-ovate in outline, pale straw-colored; length of the bristles about equal to the breadth of the valves. *R. persicarioides*.
- A. Tubercles linear-lanceolate in outline, brown, or tinged with red; bristles, when present, 1.5-2 times as long as the breadth of the valves.
 - B. Medial cauline leaves linear-lanceolate, cuneate at base, plane, Eurasian. *R. maritimus*.
 - B. Medial cauline leaves broadly lanceolate or linear-lanceolate, cordate or truncate at base, often crisped on the margin, American.
 - C. Bristles present, 1.5-2 times as long as the breadth of the valves. *R. maritimus* L., var. *fueginus*.
 - C. Bristles nearly or completely wanting. *R. maritimus* L., var. *athrix*.

In the following citation of specimens the parenthetical letter indicates the Herbarium in which these specimens may be found: (A) = Academy of Natural Sciences of Philadelphia; (H) = Gray Herbarium; (M) = Missouri Botanical Garden; (N) = New England Botanical Club; (Y) = Eaton Herbarium, Yale University.

RUMEX PERSICARIOIDES L. Sp. Pl. i. 335 (1753), not Trelease, 3d Ann. Rep. Mo. Bot. Gard. 93 (1892), and subsequent American authors.—QUEBEC: island of the Richelieu, Chambly, August, 1914, *Bros. Rolland & Victorin* no. 562 (H); margin of a salt marsh, Cacouna, August 31, 1904, *J. F. Collins* and *M. L. Fernald* (H). PRINCE EDWARD ISLAND: edge of a salt marsh, Malpeque, August 20, 1914, *Fernald* and *St. John*, no. 11,038 (H); wet brackish sand, Grand Tracadie, August 31, 1912, *Fernald*, *Long*, and *St. John*, no. 7,341 (H), August 22, 1914, *Fernald* and *St. John*, no. 11,039 (H); border of salt marsh, Bunbury, August 9 and 28, 1912, *Fernald*, *Long*, and *St. John*, nos. 7,338 and 7,340 (H). MASSACHUSETTS: sandy cove, Bay View, Gloucester, August 15, 1897, *E. F. Williams* (H & N), and *W. P. Rich*, (H).

RUMEX MARITIMUS L. Sp. Pl. i. 335 (1753); Rouy et Fouc. Fl. Fr. xii. 78 (1910); Asch. und Graeb. Syn. iv. 702 (1912); Reichenb. Ic. Fl. Germ. xxiv. t. 186 (1909). An adventive in America. NEW

on beach, Newport, D. S. W. J. Spillman 162

JERSEY: ballast, Camden, August 14, 1874, *C. F. Parker*, no. 6,909 (M & Y). PENNSYLVANIA: waste land, Philadelphia (A).

RUMEX MARITIMUS L., var. FUEGINUS (Phil.) Dusén, Svenska Exped. till Magellansl. iii. no. 5, 194 (1900). *R. fueginus* Phil. An. Univ. Chil. xci. 493 (1895). *R. persicarioides* of Trelease, 3d Ann. Rep. Mo. Bot. Gard. 93 (1892); Gray's Man. ed. 7, 357 (1908); Britton and Brown, Ill. Fl. ed. 2, i. 659; and recent American authors, not L.—QUEBEC: wet brackish sand or mud at the margin of a pond southwest of Étang du Nord village, Grindstone Island, Magdalen Islands, August 15, 1912, *Fernald, Long*, and *St. John*, no. 7,339 (H). NOVA SCOTIA: Sable Island: marsh by lagoon, July 29, 1899, *John Macoun*, no. 22,594 (H); and *St. John*, 1893, nos. 1204, 1205, 1206, 1207, 1208 (H). MAINE: Fort Popham, Phippsburg, September 14, 1907, *Kate Furbish* (H & N); sandy soil, henyard, Cumberland, July 23, 1902, *E. B. Chamberlain*, no. 421 (H & N); stagnant brackish ditch along railroad, Pine Point, Scarborough, August 10 and 13, 1898, *J. C. Parlin*, no. 1,072 (H & N). MASSACHUSETTS: Charlestown, July or August 1881, *C. E. Perkins*, no. 709 (N); S. Boston flats, July 10, 1879, *C. E. Perkins*, no. 538 (N); Falmouth, *W. G. Farlow* (Y); Marthas Vineyard, September, 1825, *Oakes* (H); Nantucket: September 1825, *Oakes* (H); Sachacha Pond, August 18, 1878, *C. E. Faxon* (H); August 1885, *L. L. Dame*, (Y); 1886, *L. L. Dame* (N); Sesachaca Pond, July 1886, *L. L. Dame* and *C. W. Swan* (Y); Notown, Penikese Island, August 5, 1904, *A. H. Moore*, no. 1,917 (N). RHODE ISLAND: salt marsh, Newport, July, 1877, *Frank Tweedy* (Y); stony shore of reservoir, Newport, September 21, 1901, *W. P. Rich* (H); Block Island, October, 1825, *Robbins* (H). Among the plants from the western part of the range the following can be cited as typical. WISCONSIN: Lake Pepin, 1861, *T. J. Hale* (M no. 46, 565). ILLINOIS: Stony Island, Chicago, July 25, 1909, *J. M. Greenman*, no. 2,805 (M); lake near Centreville, June 22, 1891, *E. Douglass* (M no. 46,605); Woodstock, 1860, *Geo. Vasey* (H & Y); sandy ground n. E. St. Louis, July 30, 1878, *H. Eggert* (M nos. 46,598 to 46,601). MISSOURI: banks and sand bars of the Mississippi, St. Louis, September, 1839, *Dr. Geo. Engelmann* (M no. 46,555); Jackson County, August 23, 1890, *B. F. Bush*, no. 2,142 (M). MINNESOTA: St. Cloud, September, 1892, *F. W. Dewart* (M no. 46,607); Fort Snelling, June 26, 1891, *Edgar A. Mearns* (H); low damp soil, Luce, Ottertail County, August 6, 1912, *Rev. Z. L. Chandonnet* (H). IOWA: Lake Edwards, Hancock County, September 10, 1895, Coll. *B. S.* (M no. 46,591). NORTH DAKOTA: borders of swamps, Leeds, August 2 and September 1, 1899, *Dr. J. Lunell* (H). SOUTH DAKOTA: low places, Vermillion, Clay County, September 11, 1911, *S. S. Visser*, no. 4,127 (M); old lake bottom, Windsor, Brookings County, July 27, 1903, *A. G. Johnson* (M no. 46,580). NEBRASKA: river banks on Middle Loup River, near Thedford, Thomas County, August 29, 1893, *P. A. Rydberg*, no. 1,572 (H); meadow, Collins, August 23, 1901, *H. P. Baker* (M); along

streams, Nuckolls County, August 1896, *Geo. G. Hedgcock* (M no. 46,574). KANSAS: stream banks, Riley County, July 1897, *R. H. Pond*, no. 1,143 (H & M); Manhattan, *J. B. S. Norton*, August 3, 1893 (M no. 46,592). MONTANA: not rare, in alkali spots, Bozeman, August 31, 1898, *J. W. Blankinship* (M no. 46,609). IDAHO: Blue Creek, Coeur D'Alene Mountains, altitude 750 meters, July 20, 1895, *John B. Leiberg*, no. 1,326 (H & M); wet places near Granite Station, Kootenai County, July 29, 1892, *J. H. Sandberg*, *D. T. MacDougal*, and *A. A. Heller*, no. 778 (H); bogs, altitude 2,200, Falk's Store, Canyon County, June 28, 1910, *J. Francis Macbride*, no. 310 (H & M). WYOMING: bogs, Mammoth Hot Springs, Yellowstone Park, August, 1884, *Frank Tweedy*, no. 24 (Y); damp soil, elevation 4,000-5,000 feet, September 1900, *Frank Tweedy*, no. 3,268 (Y); Dubois, August 10, 1894, *Aven Nelson*, no. 769 (H). COLORADO: Powell's Exploring Expedition, 1868, *Dr. Geo. Vasey*, no. 500 (M & Y); Sloan's Lake, September 6, 1910, *Alice Eastwood*, no. 105 (H & M). UTAH: alkaline marshes, Rabbit valley, altitude 6,800 feet, August 18, 1875, *L. F. Ward*, no. 598 (M); June-July 1869, *D. C. Eaton*, no. 291 (Y). NEVADA: Ruby valley, near Cave Creek Post Office, Elko County, elevation 6,000 feet, August 21, 1908, *A. A. Heller*, no. 9,526 (M); U. S. Geological Exploration of the 40th Parallel, Truckee Valley, August, 1867, *W. W. Bailey*, no. 1053 (H & Y). NEW MEXICO: wet marshy places in pastures, Santa Fe, August 8, 1847, *A. Fendler*, no. 762 (H & M); Fort Union, *Hayden* (M no. 46,573). LOWER CALIFORNIA: Tigüana, September 1884, *C. R. Orcutt* (M no. 46,623); mountains, Northern part, July 8, 1885, *C. R. Orcutt* (M no. 46,622). CALIFORNIA: Bear Valley, San Bernadino Mountains, altitude 6,500 feet, June 24, 1894, *S. B. Parish*, no. 3,059 (M); moist places near Soldiers Home, Los Angeles County, June 20, 1902, *Le Roy Abrams*, no. 2,573 (H & M); San Luis Obispo, June 26, 1876, *E. Palmer*, no. 459 (M & Y); near San Francisco, 1891, *Mrs. Brandegee* (M no. 46,619). OREGON: near mouth of Williamson River, 1,440 m., August 12, 1894, *J. B. Leiberg*, no. 711 (H & M); near a spring on a deserted ranch, "The Meadows," Wallowa County, altitude 4,250 feet, August 18, 1897, *E. P. Sheldon*, no. 8,718 (M). WASHINGTON: Mission, August 22, 1902, *Frank O. Kreager*, no. 484 (M); Olympic Mountains, Clallam County, July 1900, *A. D. E. Elmer*, no. 2,684 (M). BRITISH COLUMBIA: Vicinity of Victoria, Vancouver Island, July 24 and August 17, 1893, *John Macoun*, nos. 1,567 and 1,566 (M); Kamloops, June 17, 1887, *John Macoun* (M no. 46,625). ALBERTA: National Park, Banff, August 14, 1891, *Macoun* (M no. 46,613). SASKATCHEWAN: Palliser's British North American Exploring Expedition 1857-8, *E. Bourgeau* (H); Cd. (Cumberland) House Ft. 1825, *Dr. (ummond)* (H).

RUMEX MARITIMUS L. var. ATRIX St. John.—UTAH: Clay, altitude 5,400 feet, Vermilion, August 20, 1894, *M. E. Jones*, no. 5,839 (TYPE in Missouri Botanical Garden and Gray Herbarium). LOWER CALIFORNIA: Ensenada, August 31, 1889, *Orcutt* (M no. 46,621).

Specimens approaching this variety have been seen from COLORADO: on dry sandy ground at 8,000 feet, Parlin, Gunnison County, August 12-20, 1901, *B. H. Smith* (A). WASHINGTON: Philleo Lake, Spokane County, August 14, 1889, *W. N. Suksdorf*, no. 943 in part (A. & M).

HARVARD UNIVERSITY.

EXPLANATION OF PLATE 113.

Rumex maritimus L. drawn from Flora Exsiccata Austro-Hungarica no. 1,013, Austria inferior, in paludosis ad Maria-Lanzendorf in agro Vindobonensi, 180 mt. s. m. *Heimerl*.

Fig. 1. Mature fruit, $\times 10$.

Fig. 2. Median cauline leaf, $\times 1$.

Rumex maritimus var. *fueginus* (Phil.) Dusén drawn from *Fernald, Long, and St. John*, no. 7,339, wet brackish sand or mud at the margin of a pond southwest of Étang du Nord village, Grindstone Island, Magdalen Islands, Quebec, August 15, 1912.

Fig. 3. Median cauline leaf, $\times 1$.

Fig. 4. Mature fruit, $\times 10$.

Rumex persicarioides L. drawn from *Fernald, Long, and St. John*, no. 7,340, border of salt marsh, Bunbury, Prince Edward Island, August 28, 1912.

Fig. 5. Median cauline leaf, $\times 1$.

Fig. 6. Mature fruit, $\times 10$.

AN ATRIPLEX NEW TO NORTH AMERICA.

S. F. BLAKE.

WHILE collecting during the late summer of 1913 on Miscou Island off the northeast coast of New Brunswick, the writer met with an *Atriplex* among the seashore sands whose appearance at once struck him as peculiar. The plants, which grew singly or in groups of three or four, never in colonies as the members of the *A. patula* complex so commonly do, were at once distinguishable from that species by their strongly prostrate habit, whitish stems, and dense grayish-white mealiness. Later in the summer a few plants of the same species were found on the shore of Fox Island, one of a chain of low sandy islets in Miramichi Bay. Subsequent herbarium study of the species, which was collected on Prince Edward Island so long ago as 1888 by John Macoun, and in 1912 in some abundance on the Magdalen Islands by Prof. Fernald and his companions, has shown it to be identical with the west European plant which, when not confused

with *A. laciniata* L., has generally passed as *A. arenaria* Woods, and has recently been treated as *A. sabulosa* Rouy by Moss & Wilmott¹ in their important revision of British Atriplices.

Although the diagnostic characters of this species are quite distinctive and make it unique among indigenous North American forms, the determination of the name by which it should be known is a matter of some difficulty. It apparently formed a part of the original *Atriplex laciniata* L.,² and was referred to by Linnaeus in the *Flora Anglica*³ as *A. maritima*, a name discarded by Moss & Wilmott as a *lapsus calami*. Woods⁴ in 1849 published the plant as a new species under the name *A. arenaria*, replaced by Rouy⁵ in 1890 by *A. sabulosa* on account of the prior use of the name *A. arenaria* by Nuttall⁶ for a related species of our eastern American coast. The name *Atriplex maritimum* had in the meantime been independently given to the species by Ernst Hallier in a revision of the Atriplices of Heligoland. According to International Rules, Hallier's name should be used for the plant in view of the fact that the three previous uses of this binomial are untenable.⁷

In the Index Kewensis Rafinesque's *Atriplex mucronata*⁸ is referred to *A. arenaria* Nutt. If this were correct the name would require adoption for the latter species, and Woods's *A. arenaria* would then be available for the present plant. But the method of publication of *A. mucronata* does not seem to the writer to justify its adoption, although a specimen of *A. arenaria* Nutt. from "maritime New York" in the Prodrum Herbarium, labeled *A. mucronata* by Rafinesque himself, shows that the name was intended by him to apply to that species. It was merely mentioned incidentally by Rafinesque in a review of Pursh's *Flora*: "His *Atriplex halimus*, *A. laciniata*, *A. hastata*, are different from the European species and have been called *A. halimoides*, *A. mucronata*, and *A. dioica* by Rafinesque." Names so

¹ Moss & Wilmott in Moss, *Brit. Fl.* ii. 179. t. 185 (1914), q. v. for full synonymy.

² Linn. *Sp.* ii. 1053 (1753).

³ Linn. *Fl. Angl.* 25 (1754).

⁴ Woods, *Phytol.* iii. 593 (1849).

⁵ Rouy, *Bull. Soc. Bot. Fr.* xxxvii. p. xx (1890).

⁶ Nutt. *Gen.* i. 198 (1818).

⁷ *A. maritima* L. l. c. is considered by Moss & Wilmott to have been adopted by Linnaeus from Ray through a lapsus, an interpretation which seems justified by the fact that the name was never afterwards used by Linnaeus; *A. maritima* (L.) Crantz, *Inst.* i. 208 (1766) is *Suaeda maritima* (L.) Dumort.; *A. maritima* Pall. *Reise* ii. 289 (1773) is a mere nomen.

⁸ Raf. *Am. Month. Mag.* 176 (Jan. 1818).

published, if tenable at all, are only so through reference to a previously published description; but the description of *A. laciniata* by Pursh,¹ copied by him from Willdenow,² is quite inapplicable to *A. arenaria* Nutt., although the range allotted to the plant by Pursh indicates that species. Pursh's description runs thus: "*A. caule erecto herbaceo, foliis triangularibus profunde dentatis subtus albidis, calycibus fructus rhombeis trinerviis denticulatis.*" The plant to which this character applies is the true *A. laciniata* L., not known in America, although a near relative, *A. rosea* L., occurs as a rare ballast plant within the range assigned by Pursh. *Atriplex laciniata* L. was based by Linnaeus on several references, of which the only American is from Gronovius's *Flora Virginica*. The Clayton plant on which Gronovius's reference is based is apparently no longer in existence, neither Mr. A. J. Wilmott nor the writer having been able to discover it in a search through all the material of *Atriplex* in the British Museum. In any case Rafinesque's name cannot be adopted for *A. arenaria* Nutt., having been based on a published description whose characters disagree with those of that species in nearly every point.

Atriplex maritima is an interesting addition to the gradually increasing number of coastal and maritime species mainly of west European range which occur also on the northeast coast of North America. It may be identified by the following description.

ATRIPLEX MARITIMA E. Hallier, Bot. Zeit. xxi. Beilag [1] 10 (1863), as *A. maritimum*, not Crantz nor Pall.; *A. arenaria* Woods, not Nutt.;

A. sabulosa Rouy. Prostrate annual, branched from the base, the branches sometimes 0.6 m. long; stem whitish, slightly grooved, lepidote-farınose, at length subglabrate; branches and branchlets subopposite below, alternate above; leaves rhomboid-ovate, obtuse or subacute, mucronate, irregularly crenate-dentate above the cuneate base with about 6–10 triangular obtuse teeth, the lowest pair generally larger,

permanently whitish-lepidote-farınose both sides, more densely so beneath, 1.5–3 cm. long, 1–1.9 cm. wide, on unmargined whitish petioles 2–4 mm. long; flowers in clusters of 1–6 in the axils of nearly all the leaves, not forming spikes; fruiting calyx rhombic, broadly cuneate at base and apex, broadest at the middle, there with 1–3 low

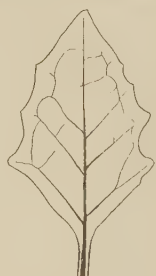


Fig. 1. *Atriplex maritima*. Leaf $\times 1$.



Fig. 2. *Atriplex maritima*. Fruiting bract $\times 1$.

¹ Pursh, Fl. i. 199 (1814).

² Willd. Sp. iv. 963 (1806).

triangular teeth on each side, 3-nerved and strongly reticulate, often with a few conical appendages on the back, whitish and coriaceous at base when fully ripe, membranous-herbaceous above, distinctly whitish-lepidote-farinose, 6-9 mm. long, 6.5-8 mm. wide, occasionally with a short distinct pedicel.—NEW BRUNSWICK: sandy beach, Miscou Harbor, Miscou Island, Gloucester County, 27 Aug. 1913, *Blake* 5565 (Gray Herb.); beach, Fox Island, Miramichi Bay, Northumberland County, 18 Sept. 1913, *Blake* 5692 (Gray Herb.). PRINCE EDWARD ISLAND: Brackley Point, 6 Aug. 1888, *J. Macoun* (Brit. Mus.). QUEBEC: damp brackish sandy beach, Grande Entrée, Coffin Island, Magdalen Islands, 20 July and 19 Aug. 1912, *Fernald, Bartram, Long & St. John*, nos. 7395, 7398 (Gray Herb.); dry sandy beach southwest of Étang du Nord wharf, Grindstone Island, Magdalen Islands, 25 July and 15 Aug. 1912, *Fernald, Bartram, Long & St. John*, nos. 7396, 7397 (Gray Herb.).

LONDON, ENGLAND.

THE 20TH ANNUAL WINTER MEETING OF THE VERMONT BOTANICAL CLUB was held conjointly with the Vermont Bird Club at Burlington, January 29 and 30, 1915, with a good attendance. The sessions were held in the Williams Science Hall, University of Vermont.

Twelve botanical papers were read and discussed. The Vermont blackberries received attention in a talk by Dr. Ezra Brainerd of Middlebury on "New Stations in Vermont for Rare Forms of *Rubus*," and in a paper by Mr. A. K. Peitersen of the University of Vermont on "Some Problems in the Study of Vermont Blackberries."

Prof. George P. Burns of the University of Vermont told about "The Publication of the New Edition of the Vermont Flora" which is now in the printer's hands.

There were papers on "Plant Quarantine Laws," and "Susceptibility of Cruciferae to Club Root," by Prof. B. F. Lutman and Mr. G. A. Cunningham respectively, both of the University of Vermont, and one on the "Forest Fungi of Bethel," by Dr. Perley Spaulding of the U. S. Department of Agriculture.

The two clubs expect to unite at the next annual meeting and the officers elected this year were the same for both clubs; viz. Pres., Dr. Ezra Brainerd, Middlebury; Vice-Pres., Dr. Henry F. Perkins, Burlington; Sec., Prof. George P. Burns, Burlington; Treas., Mrs. Nellie F. Flynn, Burlington; Editor, Mr. George L. Kirk, Rutland; Librarian, Miss Phoebe M. Towle, Burlington.—NELLIE F. FLYNN, Burlington, Vermont.

BETULA GLANDULOSA Michx. var. **sibirica** (Ledeb.) n. comb.—*B. nana* Ledeb. Fl. Alt. iv. 247 (1833), not L. *B. rotundifolia* Spach, Ann. Sci. Nat. ser. 2. xv. 194 (1841). *B. nana* L. β . *sibirica* Ledeb. Fl. Ross. iii. 654 (1849-51). *B. glandulosa* Michx. var. *rotundifolia* (Spach) Regel in A. DC. Prod. xvi. pt. 2. 172 (1864).—The form of *Betula glandulosa* with prostrate or procumbent branches and orbicular or reniform-orbicular leaves was first distinguished by Spach as *B. rotundifolia*, based on a specimen in the Paris Herbarium collected by Ledebour in Siberia and labeled by him *B. nana*. I have not seen the type, but have examined specimens from the Altai, 1844, collected by Ledebour, in the Barbey-Boissier Herbarium near Geneva, likewise labeled *B. nana* by Ledebour himself, which are identical with the plant generally called *B. glandulosa* var. *rotundifolia*. There is also a specimen of this form in the British Museum from the shores of the Lena in Siberia, collected 12 May, 1882, by Bunge, and labelled *B. nana* L. var. *sibirica* Led. Ledebour's *B. nana* β . *sibirica* was based on *B. rotundifolia* Spach, and should be adopted, being much the older varietal name.—SIDNEY F. BLAKE, London, England.

BOTRYCHIUM **angustisegmentum** (Pease & Moore), n. comb. *B. lanceolatum*, var. *angustisegmentum* Pease & Moore, RHODORA, viii. 229. (1906).—*Botrychium lanceolatum* (Gmel.) Ångstr. is a plant of boreal Europe, Asia, northwestern America and Greenland. In Europe the plant belongs to the Subarctic and Arctic-alpine floras, in northern Scandinavia and Finland, and locally in the Alps. In North America it occurs within the Arctic Circle in Greenland (latitude 63° N.) but is unknown elsewhere in the East; in the West it extends from the Aleutian Islands to Mt. Rainier in Washington and the Selkirk Mts. in British Columbia. South and east of these mountain stations its occurrence is doubtful, for although often said to reach Colorado, it is noteworthy that in preparing his *Flora of Colorado* Rydberg was unable to verify its occurrence there.

B. angustisegmentum, on the other hand, is a typical plant of the rich deciduous Appalachian forests, commonly in the shade of beech or sugar maple, occurring from the St. John Valley, New Brunswick, to eastern and southern Ontario, Ohio, Pennsylvania and New Jersey, with its area of greatest development from western Maine to central

New York. Besides belonging in a quite distinct life-zone from the boreal *B. lanceolatum*, *B. angustisegmentum* differs in essentially all its characters from the northern species. It is a much more slender plant; the sterile frond has more distant narrower and thinner segments; the fertile frond is more open, with the smaller sporangia distant and more immersed in the sides of the branches or adnate to them, while in *B. lanceolatum* the larger sporangia are crowded, often closely approximate, and merely sessile or broadly short-pedicelled; and in *B. angustisegmentum* the spores are smaller, 21-28 μ in diameter, those of *B. lanceolatum* measuring 35-45 μ .—M. L. FERNALD, Gray Herbarium.

ALTITUDINAL LIMITS IN CONNECTICUT, A CORRECTION.—In the March RHODORA (p. 66), in pointing out the error of limiting the occurrence of certain species to "elevations in excess of 1,000 feet," I slipped into the opposite error, of stating too low the altitudes of the Connecticut stations cited. In this one paragraph alone in the entire review I had failed to verify the statements, since they were supplied by a Connecticut botanist whose painstaking accuracy is ordinarily above question. But here his trusting to memory and my own failure to verify the statements furnish a pertinent illustration of the necessity of constant verification in scientific work. We have together verified the limits. The Connecticut stations for *Carex castanea* prove to be at about 700 feet altitude; the Willington station for *Ledum* is at about 400 feet, though a recently discovered station in the state is considerably lower; and one of the Salisbury stations for *Petasites* is at about 720 feet altitude. The following corrections should be made on page 66:

line 10; for "400" read: 700.

for "that the" read: that some of the.

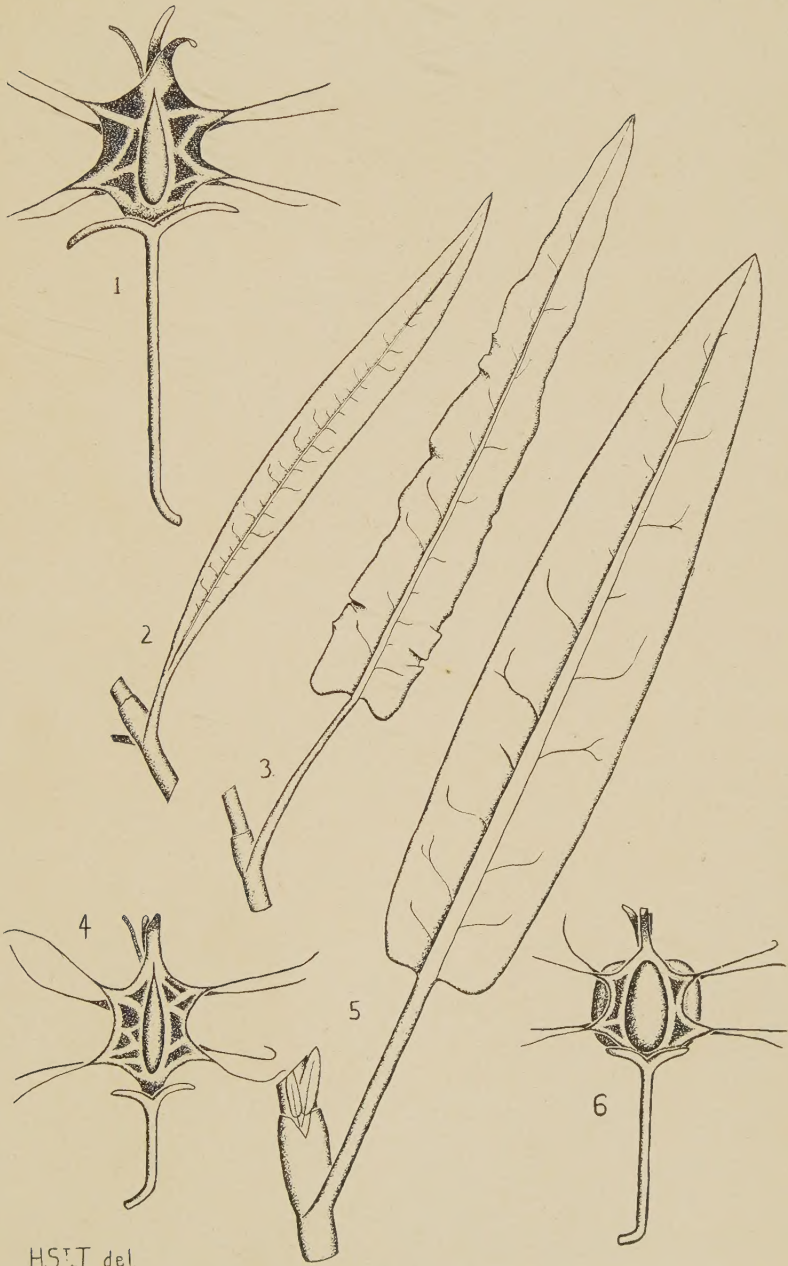
line 11; for "between 100 and 200" read: of about 400.

line 15; for "that the" read: that one of the.

line 16; for "below 600" read: of 720.

M. L. FERNALD.

Vol. 17, no. 195, including pages 49 to 72 and plate 112, was issued 2 April, 1915.



H.S.J. del.

Figs. 1, 2, *RUMEX MARITIMUS*. Figs. 3, 4, *R. MARITIMUS*, v. *FUEGINUS*.
Figs. 5, 6, *R. PERSICARIOIDES*.

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